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[Reports to the Surgeon-General, Public Health and Marine-Hospital Service.]

Experiments in the use of pyrofume for mosquito destruction.

Passed Assistant Surgeon Francis, Mobile, Ala., reports, June 5, as follows:

Pyrofume was discovered by Dr. J. H. McCormick, of Mobile, and it was at his suggestion and with his cooperation that the following experiments were performed.

Pyrofume is derived by fractional distillation from pine wood as a by-product in the manufacture of turpentine, etc. It is a clear liquid of a straw color; it has a pungent taste and an odor of pine woods. It is harmless to mucous membranes, skin, fabrics, colors, polished metals, and paint work. When heated in a test tube to a temperature of 60° C. (140° F.) a lighted match will cause a flash at the mouth of the tube. If a lighted match be applied for a few seconds to the surface of an open basin containing pyrofume the liquid takes fire.

If pyrofume be boiled in an open basin the fumes will be given off in a limited amount, but if a current of air be directed on the surface of the boiling liquid the fumes rise in a cloud. If a flame be brought into the fumes within a few inches of the surface of the liquid the fumes ignite and the entire surface of the liquid burns with a vigorous blaze, which can be extinguished instantly by dropping a lid or a single layer of cloth over the basin.

Since the fumes as they come off the liquid can be ignited, the question arises whether there is danger from carrying a flame into a room full of fumes. In order to decide this question, a room of 250 cubic feet capacity was charged with the fumes from four times the liquid necessary to kill mosquitoes. A lighted candle was then introduced into the room through a small opening. The fumes did not ignite. The experiment was repeated with ten times and twenty times the amount necessary to kill mosquitoes and the fumes did not take fire.

The fumes are deadly to *Stegomyia fasciata* and *Culex pungens*.

After considerable experimentation on different methods of generation of the fumes, it was finally decided that the best results were obtained by an apparatus consisting of a cylindrical upright retort 6 inches in diameter and 24 inches in height, under which is placed a primus lamp. At the upper end of the retort are an inlet tube and an outlet tube. The outlet tube is 3 inches in diameter and its free end is introduced into the room to be fumigated. The inlet tube is 3 inches in diameter and is attached to a hand blower.

The amount of pyrofume necessary for the cubic contents of the room is put into the retort, the primus lamp is placed beneath it and the blower is started, blowing the fumes from the surface of the liquid through the outlet tube, which is passed beneath a window sash, or through the crack of a door, or a hole in a curtain and so into the room.

Mosquitoes placed in a room containing the fumes from 265 cubic centimeters of pyrofume per 1,000 cubic feet of air space will be killed after one hour. The time of exposure may be diminished one-half by increasing the amount of pyrofume. The time necessary to generate the fumes is very short. A room with a capacity of 5,000 cubic feet can be filled with fumes in five minutes. A room of 53,000 cubic feet capacity was filled with fumes in forty-five minutes. With the apparatus in use, the time required to generate the fumes necessary to kill the mosquitoes in a room is one minute per 1,000 cubic feet of space.

When the fumes are being introduced into a room they are more dense at the ceiling than at the floor, but in a few minutes the diffusion is equal.

The room of 53,000 cubic feet above referred to had a ceiling 26 feet in height. Mosquitoes placed on the floor and near the ceiling were found dead at the end of one hour's exposure to the fumes.

Polished silver, brass, copper, steel, nickel, wrought iron, cast iron, a great variety of colored fabrics, polished mahogany and oak, and varnished and white painted work were exposed to double the fumes twice the time necessary to kill mosquitoes, namely, to the fumes of 530 cubic centimeters of pyrofume per 1,000 cubic feet of air space for two hours. All were unaltered. The same articles were exposed to the same treatment the day following and remained unchanged.

Bananas in all stages, from ripe to very green, were exposed to the fumes necessary to kill mosquitoes, namely, to the fumes from 265 cubic centimeters of pyrofume for one hour. The fruit was unharmed and was kept under observation for one week; it was not discolored, altered in taste, checked in ripening, or changed in any way. Bananas in all stages of ripeness were exposed to double the fumes twice the time necessary to kill mosquitoes and all the fruit was discolored.

The cost of pyrofume is 75 cents per gallon. Two hundred sixty-five cubic centimeters per 1,000 cubic feet of air space are required. This brings the price of material to 5 cents per 1,000 cubic feet.

SUMMARY.

1. As compared with sulphur, pyrofume stands on an equal footing in price.
2. Whereas the Federal regulations require two hours exposure to sulphur, pyrofume is efficient against mosquitoes in one hour.
3. While sulphur is injurious to metals, fabrics, paint, and colors, pyrofume leaves them unchanged.
4. Pyrofume is suitable for fumigating the engine rooms and cabins of ships, and for cars and fine residences.
5. In amounts necessary to kill mosquitoes it does not injure bananas.
6. A person can walk about in a room full of fumes and can sleep without discomfort in a room two hours after fumigation.
7. It requires only five minutes to fumigate a large room of 5,000 cubic feet.
8. The fumes are generated outside the room and conducted into it.

Case of yellow fever on steamship Holstein at Mississippi River quarantine.

The following is received from Dr. C. H. Irion, president of the Louisiana State board of health:

June 23, 1906. One case yellow fever in quarantine hospital; person of Cuban, taken from steamship Holstein from Habana. Ship fumigated and detained six days.

Report from Gulfport, Miss.—Enteric fever.

Acting Assistant Surgeon Sheely reports, June 22, as follows:

The cases of enteric fever reported to date number about 15, with 5 or 6 still ill or convalescent.

Report from Beaufort, N. C.—Smallpox.

Acting Assistant Surgeon Clark reports, June 20, as follows:

Two cases of smallpox have occurred in one family in Beaufort.